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14. ABSTRACT During contingencies U.S. Joint Force Commanders (JFCs) need forces and materiel delivered precisely when and where required. Only the correct delivery of these commodities will help JFCs mitigate risk to U.S. (and coalition) forces, accomplish mission essential tasks, and safeguard precious human life during contingencies. US Transportation Command's (USTRANSCOM) air component, Air Mobility Command (AMC), has codified in doctrine the concept of the Director of Mobility Forces (DIRMOBFOR). This senior military leader deploys to the theater during contingencies to sequence and control all inter-theater and intra-theater airlift, fulfilling JFC operational intent. In contrast, forces arriving by sealift managed by Military Sealift Command (MSC), or prepositioned and under Service component control, do not have a DIRMOBFOR equivalent. Thus, today, no in-theater agency synchronizes the distribution of prepositioned or other sealifted stocks with the arrival of scheduled lift. This means that no operational-level theater mechanism exists to coalesce these critical logistical elements into a cogent response to JFC mission demands. This paper proposes a theater Joint Mobility component (JMOB). Under this centralized command structure, airlift, sealift, prepositioned stocks, and theater distribution can be prioritized and sequenced to match the JFC's operational design. The JMOB will institute USTRANSCOM's Strategic Defense Management Initiative (SDMI) distribution scheme to move resources efficiently into the theater and through the theater logistics pipeline. Thus, assumed self synchronization will be replaced by unprecedented unity of effort.					
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CREATING A THEATER-BASED OPERATIONAL LINK BETWEEN STRATEGIC
MOBILITY AND THEATER-LEVEL LOGISTICS FOR THE JOINT TASK FORCE
COMMANDER

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A paper submitted to the Faculty of the Naval War College in partial satisfaction of the requirements of the Department of Joint Military Operations.

The contents of this paper reflect my own personal views and are not necessarily endorsed by the naval War College or the Department of the Navy.

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ABSTRACT

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CONTENTS

Chapter	Page
ABSTRACT.....	ii
Chapter 1:.....	1
The Kosovo Airlift Abuse Case.....	1
Kosovo Planning Assumptions.....	2
The Problem: No Operational-level Theater Oversight of Strategic Mobility.....	3
Chapter 2:.....	5
The Operational Level of Mobility.....	5
The DIRMObFOR Concept.....	7
Current Prepositioning and Strategic Sealift Management Processes.....	8
Afloat Prepositioning and Strategic Sealift Management Processes.....	8
Land-based Prepositioning Stock Management.....	10
Chapter 3:.....	12
The Joint Mobility Task Force Component Proposal.....	12
SDMI's Comprehensive Logistical Analysis.....	17
Other Exciting Initiatives.....	18
Chapter 4:.....	20
CONCLUSION.....	20
ENDNOTES.....	21
BIBLIOGRAPHY.....	25

Illustrations

Figures	Page
Strategic and Operational Logistics Concepts.....	6
Afloat Prepositioned Force.....	9
Prepositioned Equipment (Ashore).....	11
Joint Theater Logistics Today: No Strategic Operational Interface.....	13
Joint Movements Service Center: Strategic-Operational Interface.....	14
Proposed Theater Mobility Component: Strategic-Operational Interface Achieved.....	15
Joint Mobility Deployment Management Team (DMT).....	16
SDMI's Comprehensive Logistical Analysis.....	18

Chapter 1

The Kosovo Airlift Abuse Case

On 24 March 1999 the JFC for Operation Noble Anvil (ONA), the American piece of NATO Operation ALLIED FORCE (OAF), began operations. The objective: stop Slobodan Milosevic's "ethnic cleansing" and force his troops out of Kosovo.ⁱ Clearly with no significant American force based in the area, "a massive deployment of aircraft, troops, and cargo was required and a high tempo of sustainment operation was...[necessary] ...to put 'teeth' into the OAF commitment."ⁱⁱ

Unfortunately, the JFC, badly in need of personnel and materiel augmentation, did not have the benefit of a reception, staging, onward movement and integration (RSO&I) operational artist to sequence and synchronize the deluge of airlifted, sea lifted, and prepositioned stocks arriving in the Kosovo theater of operations. Although the JFC's Joint Force Air Component Commander (JFACC) had a DIRMObFOR to work airlift, "a sealift and prepositioning coordinator was missing."ⁱⁱⁱ Yet each component of the JFC wanted its personnel and materiel to arrive in the theater immediately. This resulted in an unprecedented demand for airlift. The Deputy DIRMObFOR for ONA put it this way: "Airlift is like candy....Everybody wants some....I want it now....I want it all."^{iv} With no "logistical sheriff" to adjudicate and prioritize--forcefully, perhaps--the often competing demands of the theater Service components, "...there was a lopsided use of airlift in comparison with sealift and prepositioning assets."^v

Kosovo Planning Assumptions

ONA's disproportionate use of airlift (versus sealift and prepositioned stocks) was based on incomplete planning assumptions. The Department of Defense's (DOD) after-action report characterized the planning as follows:

Ground and sea infrastructure capabilities were not assessed until later in the operation. As a result, planners lacked sufficient information to make informed decisions about the desirability of employing additional capabilities such as Joint Logistics Over-the Shore or strategic sea lift.^{vi}

This planning shortfall was clearly illustrated during ONA's Task Force Hawk (TF Hawk), the airlift deployment of AH-64 Apache Helicopters from Germany to Macedonia, later redirected to Albania.^{vii} From 8 April to 6 May 1999, 442 C-17 sorties were used to move the Apaches.^{viii} Army commanders, "pressed for time, wanted their 'stuff' immediately and were unwilling to wait the perceived extra time it would take to deploy by sea."^{ix} Planners at TRANSCOM later estimated that the Apaches could have been moved within 14 days (versus the 21 days required by airlift alone), if sealift had been used instead.^x

If the nature of the Kosovo war had transformed from an airpower scenario to one requiring the immediate introduction of ground forces, the magnitude of the TF Hawk planning miscue alone could have had disastrous effects on ONA operations. At the very least, by unnecessarily tying up strategic airlift resources, theater planners robbed the JFC of operational flexibility. Theater mobility planning efforts must fully incorporate all modes of transportation, distribution and supply.

Until USTRANSCOM employed the Strategic Defense Management Initiative (SDMI) to reengineer transportation, distribution, and supply lines of communication from the United States to the Balkans in 1999, these modes always operated independently and

were not coordinated.^{xi} As an example of the inefficiencies this situation created, RAND experts cited the example of arriving pallets at Dover AFB, destined for Bosnia, not being matched to departing C-5 airlift.^{xii} This not only increased Ramstein AB aerial port hold time, it also impacted the overall coordination between Dover flights to Ramstein and Ramstein flights to Tuzla.^{xiii} Synchronization was not just a problem for air shipments in 1999. Sea shipments were affected as well. Some 57 percent of bulk cargo shipments out of Norfolk, Virginia, missed departing surface lift. 59 percent of containerized shipments to US Army Europe missed the next available sailing ship as well.^{xiv} The impact of these inefficiencies upon ONA is unknown and perhaps incalculable, but nevertheless real.

The Problem: No Operational-Level Theater Oversight of Strategic Mobility

ONA saw the typical airlift to sealift ratio for cargo movement, usually five percent to 95 percent, drastically changed; 62.4 percent of the tonnage moved by air.^{xv} The use of much less efficient airlift occurred, according to transportation expert Nonie Cabana, because of “the instinct to go with the fastest mode under pressure to meet deadlines.”^{xvi}

At the operational level of war, who is tasked doctrinally to integrate elements of the strategic mobility triad (airlift, sealift, and prepositioned stocks) to accomplish force buildup and expedite force closure in the theater? The answer is no one. Thus, during ONA, theater-level organizational stovepipes and the compartmentalization of information combined to create what some characterized as a “multiple task force” logistics planning scheme.^{xvii} Today, U.S. senior leadership, challenged to deliver credible American combat firepower and humanitarian goods rapidly to global hotspots, cannot afford a seam between strategic and theater mobility.

Cabana's ONA research reinforces this conclusion. "...Experience confirmed that all instruments of the strategic mobility triad were not fully engaged because there was no single mobility flowmaster dedicated to integrate the triad into a coherent, agile, and responsive system." ^{xviii} Given these facts, this paper contends that there is a critical gap in U.S. joint mobility doctrine because it does not address a joint RSO&I methodology. To correct this situation, this paper proposes doctrinal creation of a theater-based Joint Mobility component (JMOB). This component will adapt innovations from USTRANSCOM's SDMI to fully integrate all elements of strategic mobility/operational logistics interface. Significant improvements in force projection and force sustainment should result from this recommendation.

Chapter 2

The Operational Level of Mobility

When comprehensive logistics planning is conducted, modern U.S. strategic mobility capabilities can meet operational theater requirements during contingencies. Whether arriving by airlift or sealift, or taken from prepositioned stocks, the timeliness and accuracy of augmenting personnel and materiel still makes or breaks an operational commander's plans for a campaign or major operation. Moreover, at the theater-operational level of mobility, adequate infrastructure must be in place to support continued operations. Operations can culminate prematurely if inadequately sustained by logistical replenishment.^{xix}

History shows logistics-sourced culmination can render the accomplishment of strategic objectives impossible. According to noted theorist Milan Vego:

The German Reichswehr and Wehrmacht did not pay adequate attention to logistics because they overemphasized operations. This cost Germany dearly in World War I when many of their major operations were stopped prematurely because, despite provisioning of supplies in the homeland, supplies did not reach the troops at the front in time. The main reason was the inadequate transportation network, destruction of railroads, inadequate security in the rear, and unfavorable weather conditions.^{xx}

Clearly the relationship between strategic mobility capability and theater-operational requirements is critical to the conduct of campaigns and major operations. Figure 1 shows the connection between strategic mobility and "theater logistics"--a term used interchangeably with the term "mobility"--infrastructure. Whereas strategic mobility delivers campaign-critical augmenting personnel and materiel from U.S. bases to the theater (or

between theaters), the focus of theater logistics is necessarily fixed on the RSO&I of resources. According to Vego:

Operational logistics extends from the theater's sustaining base or bases to the forward combat service support units and facilities organic to major tactical forces. Therefore, it links strategic logistics to tactical logistics. Its main purpose is to ensure that one's actions are continuous through all phases of a major operation or campaign.^{xxi}

In other words, “operational logistics defines the operational reach of combat forces—the distance over which military power can be concentrated and employed decisively.”^{xxii}

Problems occur if operational level control of theater logistics is missing. This was highlighted in lessons learned from Operation Uphold Democracy, U.S. action in Haiti in 1994, where the DIRMOBFOR indicated that an overall flowmaster was needed. In his words, “No single individual was able to predict the arrival or departure schedules for either

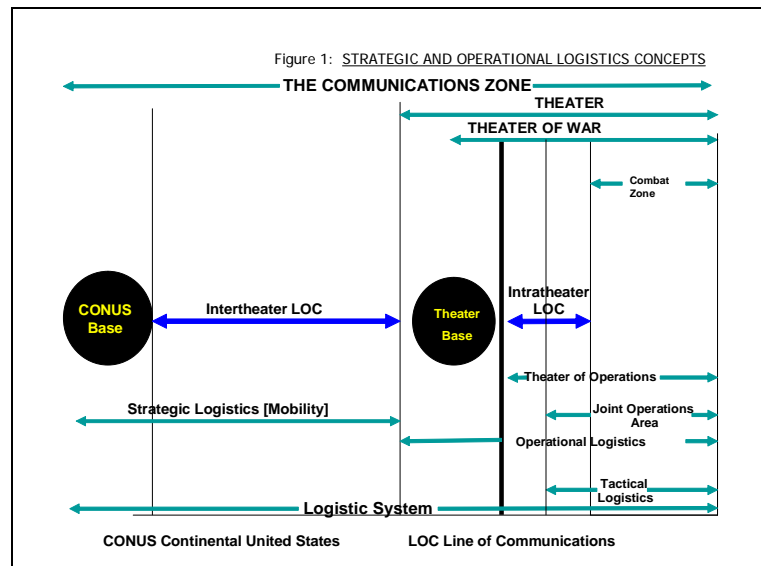


Figure 1. Strategic and Operational Logistics Concepts^{xxiii}

the USAF or CRAF (Civil Reserve Air Fleet). . . . As a result, forces were sent piecemeal into the theater with relation to assigned tasks. . . . Synchronization of airflow did not adequately support the mission.”^{xxiv} This should have come as no surprise. Without theater-operational

level management of transportation requests during Desert Shield/Desert Storm, nearly half of all sustainment cargo destined for the Persian Gulf was coded “required delivery date (RDD) ‘999—the highest priority.’”^{xxv} As a direct result, strategic aerial ports of embarkation in the U.S. were backlogged with “bulk quantities of sand bags, fence posts, toilet paper, T-shirts, mittens, sweat shirts, and admin[istrative] supplies.”^{xxvi} Although these supplies are often air-eligible, bulk commodities are more efficiently moved by sealift. But, with no sheriff to prioritize the flow of goods (or even the classes of supply) into the Kuwaiti theater, even time-critical commodities like aircraft engines would be delayed at least 2-3 days, with potentially huge impact.^{xxvii} The need for mobility oversight at the operational level is the impetus behind AMC’s development of the DIRMObFOR concept.

The DIRMObFOR Concept

Just what is a DIRMObFOR? Positioned by the Air Force at the crossroads of strategic airlift (a.k.a. “intertheater” airlift), tactical airlift (a.k.a. “intratheater” airlift) and a theater’s RSO&I effort meet, this senior leader is responsible for all air mobility movement in support of the Joint Force. According to AFDD 2, “The DIRMObFOR is the COMAFFOR’s [Commander of Air Force Forces] or JFACC’s [Joint Force Air Component Commander] designated coordinating authority for air mobility with all commands and agencies both internal and external to the JFC.”^{xxviii} Typically a senior officer expert in the Area of Operations (AOR) airlift operations, the DIRMObFOR administers a staff called the Air Mobility Division (AMD). Ideally the AMD is located in the theater’s Air Operations Center (AOC). According to Air Force doctrine, “the DIRMObFOR’s specific authorities and responsibilities include:

- Directing the integration of intertheater air mobility support provided by

USTRANSCOM-assigned mobility forces.

- Coordinating the tasking of USTRANSCOM intertheater air mobility forces attached (TACON) to the JFC.
- Directing the tasking of intratheater air mobility forces (air and ground) attached (either OPCON or TACON) to the JFC.
- Coordinating with the AOC director to ensure all air mobility operations supporting the JFC are fully integrated with the ATO cycle and deconflicted with all other air operations.
- Coordinating with the tanker airlift control center (TACC), through the AMD, all intertheater air mobility missions to ensure the most effective use of these resources in accomplishing the JFC, theater, and USTRANSCOM missions.^{xxix}

The DIRMOBFOR construct thus ensures a seamless and timely coordination process that supports the JFC's operational objectives.^{xxx}

Despite anecdotal problems allegedly associated with the DIRMOBFOR concept, the Joint Staff has codified the DIRMOBFOR in joint doctrine, a clear recognition of the key enabling role this individual plays.^{xxxi} However, this theater-based, operational-level logistics concept still has no doctrinal equivalent among the other elements of the strategic mobility triad, sealift and prepositioning.

Current Prepositioning and Strategic Sealift Management Processes

Afloat Prepositioning and Sealift Management

From a JMOB (or DIRMOBFOR) perspective, the timely release of prepositioned stocks can reduce the airlift burden, adding flexibility to the JFC. Given the strategic importance of prepositioned stocks, the decision for executing them is made by our nation's senior leadership. But many different agencies are responsible for the daily management of these resources. There are two kinds of prepositioned stocks maintained under the Department of Defense prepositioning program: afloat and ashore (depicted in Figures 2 and 3, respectively). The Afloat Prepositioning Force comprises three types: 13 Army Combat Prepositioning Ships, 16 Marine Corps Maritime Prepositioning Ships, and 13 Defense Logistics Agency (DLA) Logistics Prepositioning Ships for the Navy and Air Force.^{xxxii}

The Combat Prepositioning Ships (Army Preposition Stocks THREE; APS THREE) carry the equipment and sustainment stocks required by a U.S. Army 2X2 heavy brigade (6,000 soldiers) with a combat duration of 15 days.^{xxxiii} These ships are large medium-speed, roll-on/roll-off ships, known as LMSRs.^{xxxiv} According to Army Operations Support Command Regulation 10-22, the APS THREE is Operations Support Command (OSC) responsibility in every detail (i.e., plan, execute, maintain, redistribute, release for contingency, etc.).^{xxxv} Further, OSC serves as Army Materiel Command's logistics coordinator by working through Army theater components (e.g., U.S Eighth Army in Korea, U.S. Army Pacific, U.S. Central Command, U.S. European Command).^{xxxvi}

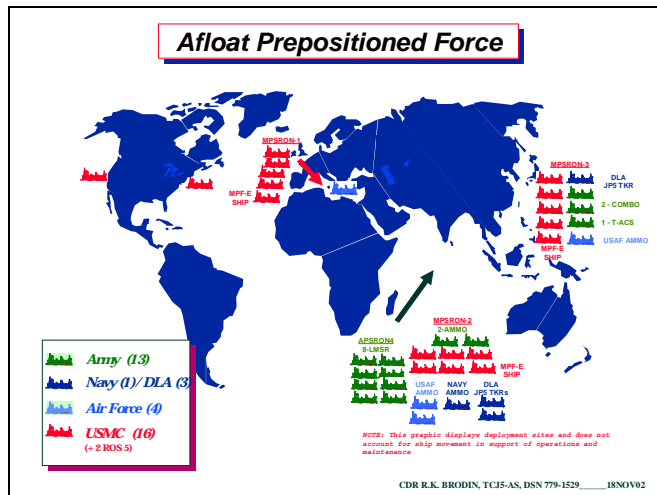


Figure 2. Afloat Prepositioned Force^{xxxvii}

The U.S. Marine Corps uses 16 Maritime Prepositioning Ships (MPS) to carry equipment capable of supporting a variety of missions, “...sufficient to sustain a Marine Corps Air/Ground Task Force of 17,600 marines for up to 30 days of operations....”^{xxxviii}

These vessels are distributed among three MPS squadrons. Commanding Generals for II MEF [Marine Expeditionary Force; MPS Squadron ONE], I MEF [MPS Squadron TWO], and III MEF [MPS Squadron THREE], perform all the deployment planning and training. Maintenance, acquisition, prepositioning, and stores replenishment are the responsibility of the Commander, Marine Corps Logistics Base Albany, Georgia. Finally, the ships themselves are “government owned and civilian operated under contract to MSC.”^{xxxix}

Operating under Military Sealift Command’s Logistics Prepositioning Ships Program (LPS), 13 vessels carry U.S. Navy, U.S. Air Force, U.S. Marine Corps, and Defense Logistics Agency (DLA) supplies. Eight ships are chartered roll-on/roll-off/container carriers loaded with ammunition.^{xl} Two more ships are government owned supporting DLA, carrying petroleum products.^{xli} “Two ships, designated aviation logistics support ships, serve as intermediate maintenance facilities for U.S. Marine Corps fixed and rotary wing

aircraft.”^{xlii} Taken together, the multi-agency nature of afloat prepositioning coordination poses a challenge to operational artists seeking unified effort when contingencies occur.

Land-Based Prepositioned Stock Management

Similar to the management scheme for afloat “prepo,” many agencies are involved in the management of land-based stocks. Such commodities are theoretically quicker to mobilize than airlift, needing only trucks or intratheater airlift to move to the area of operations. The Air Force, Army and Marine Corps all have land-based prepositioned stocks. The Air Force’s land-based prepositioned stocks are called “Harvest Falcon” or “Harvest Eagle” and are managed by the Service’s War Reserve Material program.^{xliii} Just as in the case of the Army’s afloat APS, OSC directs and manages every detail of land-based APS operations in-theater.^{xliv} Finally, the Marine Corps’ Norway Air-Landed Marine Expeditionary Brigade (NALMEB, a.k.a., NALMAGTF) is its only land-based prepositioned stock.^{xl} These stores are under the direct control of the II MEF Commander, with Marine Forces Europe (MARFOREUR) oversight.^{xlvi}

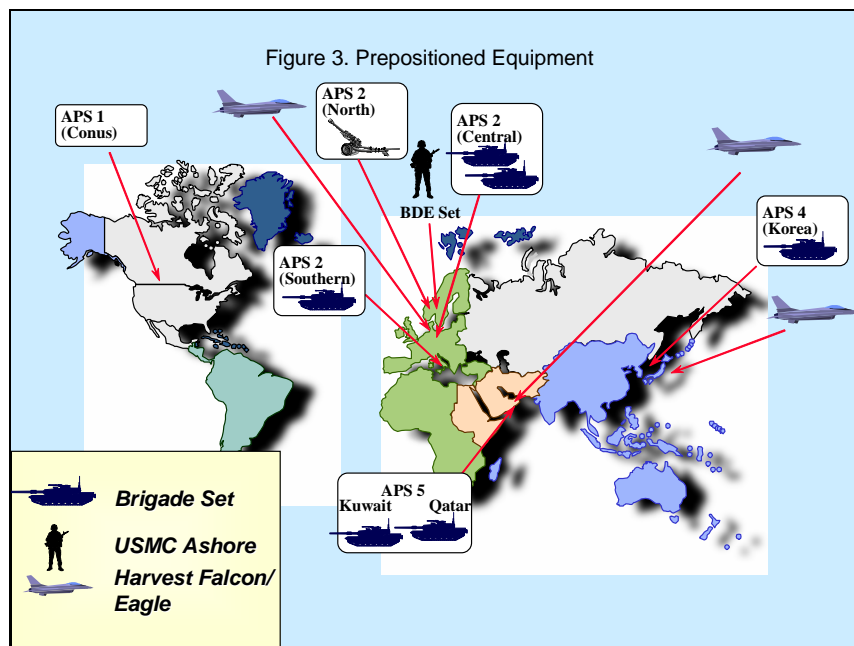


Figure 3. Preposition Equipment (Ashore)^{xlvi}

To sum up, given the many diverse, stove-piped elements of the strategic mobility triad, central operational control by a JFC is a very difficult challenge. Yet, this is the very challenge that must be met in order to extend a JFC's operational reach. All elements of strategic mobility and theater distribution require in-depth analysis prior to contingencies. In many ways, a successful pre-conflict SDMI by the proposed JMOB can become a *de facto* operations enabler.

Chapter 3

The Joint Mobility Component Proposal

Why make a change? According to Joint Publication 4-0, Doctrine for Logistic Support of Joint Operations, “to exercise control at the strategic, operational, and tactical levels of war,...joint force and theater-level Service component commanders must also exercise control over...logistics.”^{xlvi} As David Schrady points out, “the joint force commander needs unit closure information while the deployment surge is under way.”^{xlvi} Schrady places special emphasis on the term “information.” Under the current theater logistics arrangement, what JFCs receive today is what Schrady terms “data.” USTRANSCOM, through the Global Transportation Network (and other “enabler” systems), feeds data to theater component logistics cells. (See Figure 4.) “Data are for *tracking* [original emphasis] something.”¹ Instead, the goal of a combatant logistics command and control system should be to extract information and then knowledge from raw data—for

planning, tracking, and prediction.^{li} Only with operational-level information can a JFC achieve decision-making dominance over the theater, creating mission success.

Key information for a JFC includes: the sustainability of allocated forces, the theater's current sustainment stocks, the capacity of assigned and allocated intratheater airlift, and the theater's distribution infrastructure (roads, trucks, drivers, rail lines, highways, waterways, and port-over-the-shore capabilities).^{lii} In order for the JFC to obtain such operational-level information, it is strongly suggested that a single node assimilate the data inexorably generated by a multi-Service force deployment effort. That single node should be the JMOB, an agency subordinate to the JFC under the leadership of a commander, the Joint Mobility Component Commander (JMOBC).

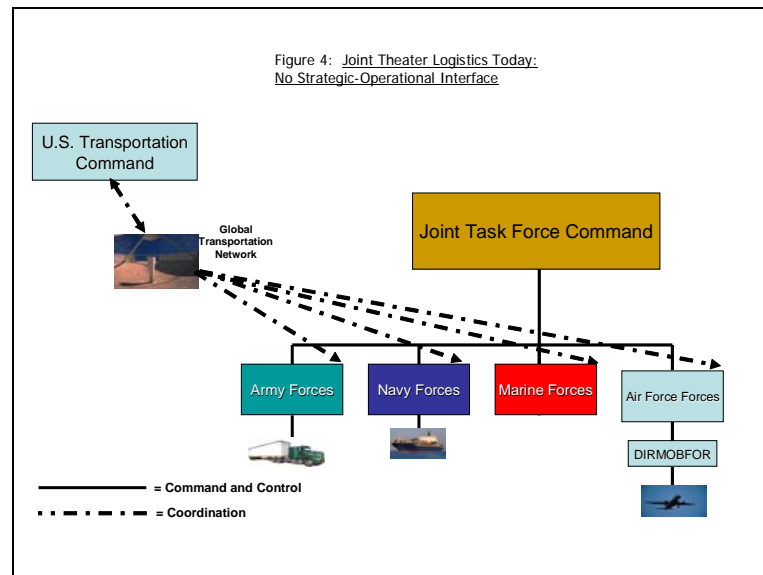


Figure 4. Joint Theater Logistics Today: No Strategic-Operational Interface^{liii}

The current system of logistics support for joint operations does not achieve what Joint Publication 4-0 requires: “a logistic support system...in harmony with the structure and employment of the combat forces it supports...,” whose “...unity of effort is best attained under a single command authority.”^{liv} However, the JMOB construct meets the intent of

Joint Publication 4-0. The concept illustrates an arrangement where direct coordination occurs between the JFC and his node for operational-level information. The JMOBC will be designated by the JFC based on his theater logistics infrastructure familiarity and proven leadership ability. The Services will nominate candidate JMOBCs to the JFC. Ideally, these senior leaders will be picked from supply or transportation specialties. This setup is similar to the Joint Movements Center used in Desert Storm, which is pictured in Figure 5.^{lv} The Joint Movement Center served as “the combatant commander’s validation, movement planning, and monitor of the theater airlift system.”^{lvi} Although it achieved a strategic-operational link for the theater, it did not integrate the strategic and theater distribution systems.

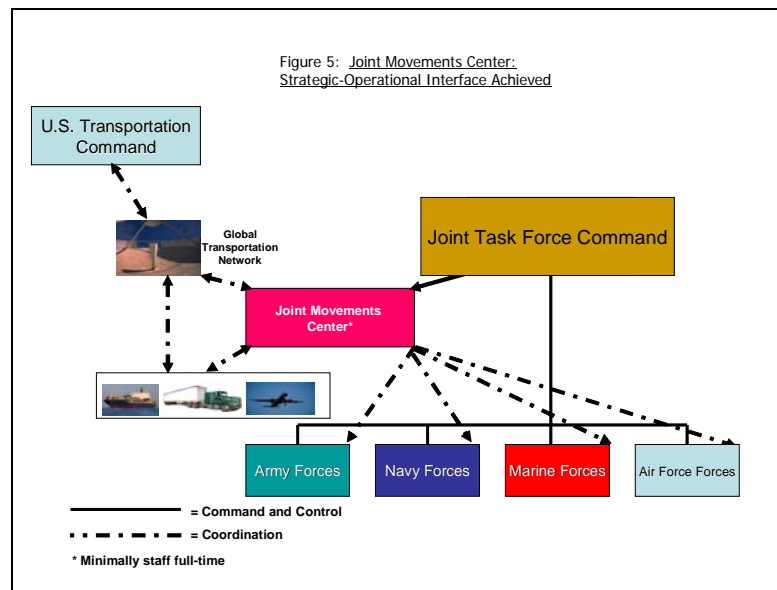


Figure 5. Joint Movements: Strategic-Operational Interface

The proposed JMOB process (depicted in Figure 6) must go a step further. A transformational theater joint mobility component will do much more than merely validate, movement plan, and monitor deployments. It will provide for a theater-level DIRMOBFOR, but with a multi-modal focus vested with operational authority. The fusion of the strategic

mobility triad can occur at the port of debarkation under the direct command and control of the JMOBC. His authority would replace today's tortuous task force theater logistics environment. Uncoordinated, unsequenced, and unsynchronized prepositioned stocks, intratheater and intertheater airlift, sealift, trucking, rail line usage, and port management would likely be a thing of the past.

This proposal does indeed go further than the Joint Movements Center concept recommended by Joint Publication 4-01.3, Joint Tactics, Techniques and Procedures for Movement Control. While the Joint Movements Center, run by a Chief Joint Movement Center working for the theater's J-4, is responsible for coordinating the employment of all theater transportation modes, neither he nor the J-4 are imbued with operational control to ensure the execution of theater transportation priorities *vis-a-vis* strategic mobility.^{lvii} This paper's proposal seeks not just to create a strategic-operational interface, but also to make it the standard, a framework in which all JTFs should work.

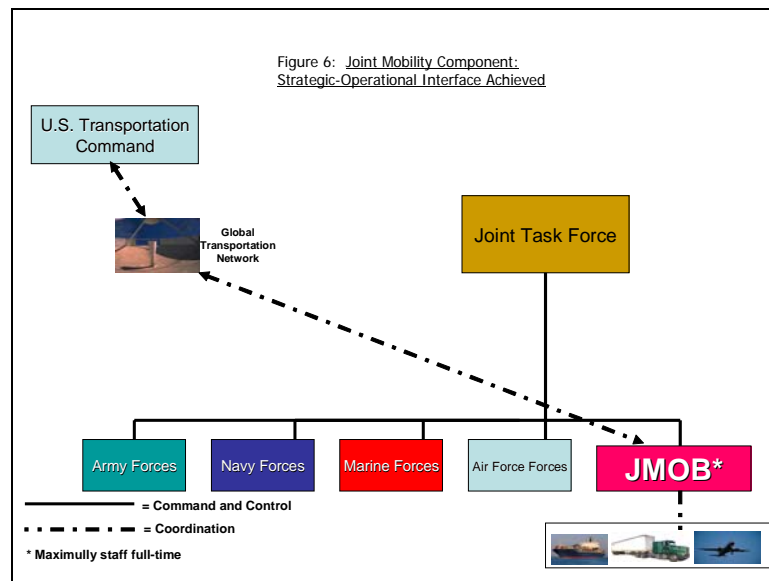


Figure 6: Joint Mobility Component: Strategic-Operational Interface Achieved

Staffed by logisticians contributed by the Services, the JMOB will effectively remove the operational logistics data workload from component planning staffs, allowing them to focus on tactical logistics. Component commands would be afforded the opportunity to focus on the fight, their true core competency. Even though the Air Force has the DIRMOBFOR concept working some of these issues, senior field leadership has cited the need for a JMOB-level of more overarching C2 for theater logistics. Brigadier General Richard C. Marr, in February 1996, just after his duty as DIRMOBFOR for Operation Joint Endeavor, US operations in Bosnia, commented: “The Air Force [should] consider ways to improve the overall airlift process. Initial analysis should consider reorganization options and/or using a ‘one-belly button,’ universal command and control network/agency.”^{lviii} The proposed JMOB could most assuredly become that one belly button. (see Figure 7.)

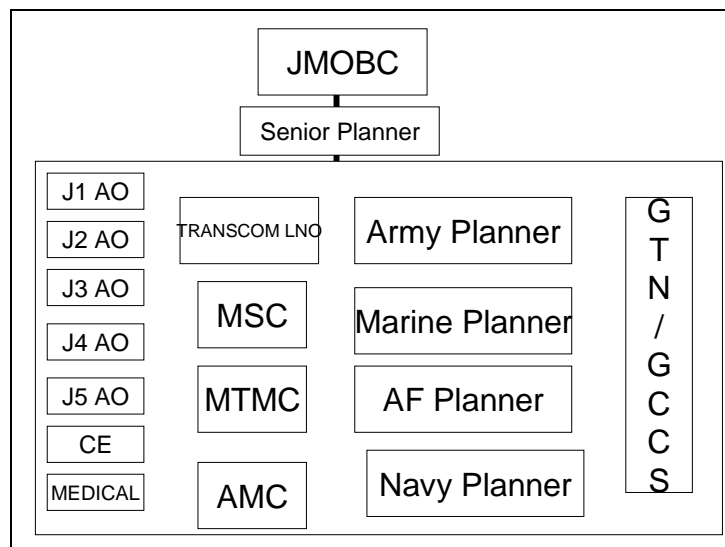


Figure 7: Joint Mobility Component's Deployment Management Team (DMT)

With the issuance of the first alert order, the JFC will appoint a JMOBC to lead the deployment. The JMOBC will be supported by a Senior Planner, a person with a solid background in joint force planning (i.e., Joint Strategic Capabilities Plan, the theater

OPLAN, the theater critical forces list, the theater scheme for dominant maneuver, etc.) This person will be responsible to coordinate with USTRANSCOM's Mission Control Center (MCC). The envisioned JMOB team, geographically co-located with the JFC's Joint Operations Center (JOC), is comprised of a small number of personnel, operating on a 24-hour basis. Detailed for duty in the JMOB will be theater joint staff officers with strong time-phased force deployment data (TPFDD) backgrounds. USTRANSCOM component agency representatives will immediately deploy to the theater with the issuance of the first alert order. Theater Service component staffs will assign force planners (personnel, J1; intelligence, J2; operations, J3; logistics, J4; operations plans, J5; civil engineer; and medical) with solid experience in the Joint Operations Planning and Execution System (JOPES), Global Transportation Network (GTN), and Global Command and Control System (GCCS).

The JMOBC will be responsible for the following:

- Developing the theater movement plan, fulfilling JFC priorities and scheme
- Providing the JFC with force closure estimates and theater infrastructure analysis
- Apportioning theater distribution elements (intratheater airlift, trucking, trains, etc.) by phase of the operation order
- Allocating theater distribution resources to accomplish daily movements
- Coordinating an integrated theater movement plan with strategic and theater distribution elements (i.e., DLA, USTRANSCOM, MTMC, MSC, AMC)
- Adjudicating theater transportation movement priorities
- Tracking and sustaining the force
- Conducting redeployment planning

Finally, this proposal would invest theater-level operational authority into the JMOBC office itself, creating conditions for true operational artistry. Such artistry is possible by JMOB's employment of the Strategic Distribution Management Initiative

(SDMI) methodology and by taking advantage of other exciting cargo velocity initiatives already underway.

SDMI's Comprehensive Logistical Analysis

Detailed logistical infrastructure analysis is what SDMI gives the JFC. An illustration of a process analyzed by SDMI is shown in Figure 8. Pictured are the elements that impact Customer Wait Time (CWT) for an Army vehicle part. Any friction occurring during any of the many dissimilar and separate processes (i.e., retail supply, supply management, DLA distribution, direct vendor delivery (DVD)) will negatively impact CWT. The SDMI process improvement is purported to deliver CWT minus (CWT(-)) at all points along the distribution timeline. Based on the newly streamlined processes, a definite delivery time, or so-called "Time Definite Delivery (TDD)" is therefore feasible, with all the randomness of the collective strategic mobility and theater distribution systems now controlled, monitored and, theoretically at least, mitigated.^{lix} Also mitigated will be TF

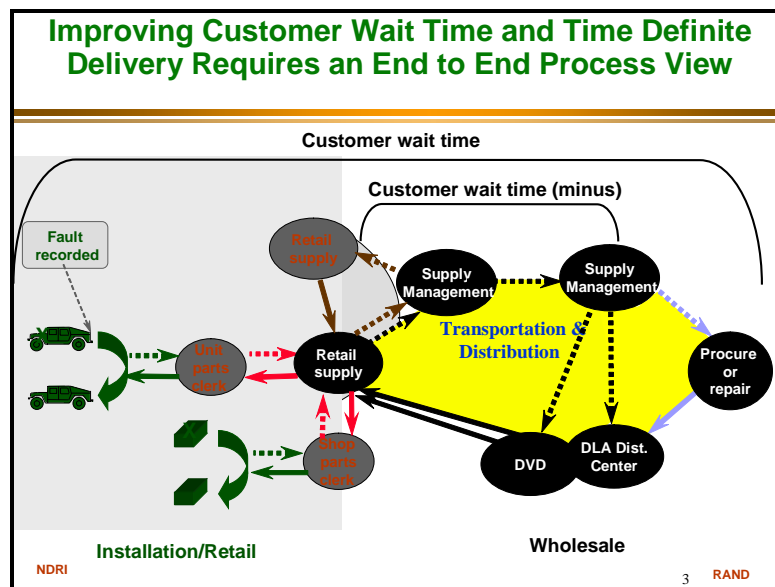


Figure 8. Comprehensive Logistical Analysis^{lix}

Hawk's modal guesswork. Finally, and most importantly, through SDMI-derived processes the JMOBC will provide the JFC and his component commanders precise and accurate unit closure information.

Other Exciting Initiatives

Logistics reengineering is not the exclusive purview of JMOB and SDMI. Innovation is occurring under Service leadership too. In an effort to close U.S. forces into areas of operations more rapidly and with greater predictability, many innovations are under study. "One such design, FASTSHIP is thought to be capable of speeds of 45 knots, carrying 8000 long tons, over 5000 nautical miles."^{lxi} Under the transformational leadership of Army Chief of Staff General Eric Shinseki, Stryker Brigade Combat Teams (SBCT) are being created that can rapidly deploy anywhere in the world in 96 hours or less.^{lxii} The goal: a division on the ground in 120 hours; five divisions on the ground in just 30 days.^{lxiii} The synthesis of streamlined forces available for movement, comprehensive planning assumptions, feasible strategic movement plans, JFC-based theater-operational decisions, and a predictable high velocity theater RSO&I infrastructure will achieve unparalleled success for commanders at all levels.

Chapter 4

Conclusion

The alternative to this proposal is the *status quo*. Under that arrangement, as each situation arises, JFCs must painfully develop logistics C2 from scratch. According to Naval Doctrine Publication (NDP) 4, Naval Logistics, “the joint force commander will determine his appropriate Log C2 organization based on the mission, operating environment, and assigned assets.”^{lxiv} In this vein, JFCs will continue to be constantly bombarded with data from logisticians when operational level decisions require comprehensible information. Finally, without a JMOB, theater component commanders (and the logistics planning staffs that support them) will airlift as many commodities as possible, when other modes might be more efficient or rapid. Assumed self synchronization at the port of debarkation cannot be

the best hope for JFCs in need of operational reach. Rather, directed synchronization is a must for self synchronized operations to work.

The successful integration of strategic mobility triad elements will serve operational commanders well. Given that operational-level logistics are impacted by all elements of the strategic mobility triad (and the infrastructure that links them to the foxhole), JFCs would likely welcome an in-theater agent to tie them all together. Theater planning assumptions must necessarily be comprehensive, incorporating all elements of logistics. U.S. JFCs will not easily succeed if they do not have someone, a flowmaster, to conduct the deployment and sustainment requirements of the combat forces. Skillfully employing USTRANSCOM's SDMI process improvements, JMOBC can ably face this challenge for global contingencies.

BIBLIOGRAPHY

- Brown, Daniel G. "Strategic Distribution Management Initiative Underway."
Washington, DC: Defense Transportation Journal, October 2001. Available through Proquest, order # 756874291.
- Brence, John. Block II Instruction, Strategic Mobility. Newport, RI: Naval War College, College of Naval Warfare Class, 20 November 2002.
- Cabana, Nonie C. "Total Mobility Flow: A Post-Kosovo Role for the DIRMObFOR."
Maxwell AFB, AL: Air & Space Chronicles. 20 September 2000.
<<http://www.airpower.maxwell.af.mil/airchronicles/cc/cabana2.html>> [3 May 2003].
- Callahan, Shawn M. The Impact Of Fastship And High Speed Sealift On Strategic Sealift. Maxwell Air Force Base, AL: Air University, Air Command and Staff College, April 1998. .
<<http://handle.dtic.mil/100.2/ADA395802>> [14 May 2003]
- Coy, Gary L. DIRMOBFOR Working Brief. Fort Dix, NJ: Air Mobility Warfare Center, AMWC Course, "DIRMOBFOR," March 2000.
- Department of the Army. Operations Support Command. OSC Regulation 10-221. Rock Island, IL: Army Materiel Command, Operations Support Command, 30 March 2001.
- Department of the Marine Corps. Maritime Prepositioning Force. Washington, DC.
<<http://hqinet001.hqmc.usmc.mil/p&r/concepts/2000/pdfs/chapter2/CH217MPF.PDF>> [3 May 2003]
- Department of the Navy. Naval Logistics. Naval Doctrine Publication 4. Washington, DC: 20 February 2001.
<<http://www.nwdc.navy.mil/Library/Documents/NDPs/NDP4/ndp4.pdf>> [3 May 2003].
- Dumond, John. The Strategic Distribution Management Initiative: Moving to a New Strategic Distribution Vision. St Louis, IL: USTRANSCOM, NDRI, RAND, February 2002.
- Folkesson, John. Explaining RAND Metrics or Similarities, Differences & Content of Strategic Distribution CWT (-) vs. VM RWT & CWT. St Louis, IL: USTRANSCOM, NDRI, RAND, May 2002.
- Hart, Gary. Strategic Defense Management Initiative, A Brief for the Advanced Study of Air Mobility. Scott AFB, IL: U.S. Transportation Command, 1 July 2002.

- Headquarters Air Mobility Command. Director of Mobility Forces (DIRMOBFOR) Policy and Procedures. Air Mobility Command Instruction 10-202, volume 7. Scott AFB, IL: 1 May 1998.
- Headquarters U.S. Air Force. Organization and Employment of Aerospace Power. Air Force Doctrine Document 2. Washington, DC: 17 February 2000.
<<http://www.cadre.maxwell.af.mil/warfarestudies/iwac/IWAC%20PDF/afdd2.pdf>> [3 May 2003].
- _____. Air Mobility Operations. Air Force Doctrine Document 2-6. Washington, DC: 25 June 1999.
<<http://www.e-publishing.af.mil/pubfiles/af/dd/afdd2-6/afdd2-6.pdf>> [3 May 2003].
- Headquarters U.S. Department of Defense. Report to Congress: Kosovo/Operation Allied Force After-Action Report. Washington, DC: 31 January 2000.
<<http://www.defenselink.mil/pubs/kaar02072000.pdf>> [10 May 2003].
- Kee, Randy A. Bridging the Gulf Between Theater and Strategic Air Mobility. Wright-Patterson AFB, OH: Air University. Air Force Institute of Technology, AFIT/GMO/LAL/96N-4, November 1996.
- Koko, Richard W. Strategic Mobility for the National Military Strategy. Maxwell AFB, AL: Air University. Air War College, April 1993.
- Leonard, Kevin. Key Logistics Issues From Kosovo, Can the United States Achieve Strategic Velocity? Carlisle Barracks, PA: U.S. Army War College, 22 May 2000.
- Lust, Larry J. Logistics and Security Assistance Directorate: Kosovo Campaign Logistics. Stuttgart-Vaihingen, Germany: USEUCOM, 15 September 1999.
- Marr, Richard C. "AMWC/CC Operation Joint Endeavor End-of-Tour Report." USEUCOM Operation Joint Endeavor conducted 29 December 1995 to 10 February 1996, Joint Universal Lessons Learned (JULLS) database, number 22749-30793. Stuttgart-Vaihingen, Germany: USEUCOM, 21 February 1996.
- Matthews, James K. and Cora J. Holt, So Many, So Much, So Far, So Fast. St Louis, IL: US Transportation Command, September 1996.
- Melville, Mark A. The Director of Mobility Forces and Command and Control of Airlift. Wright-Patterson AFB, OH: Air University, Air Force Institute of Technology, AFIT/GMO/LAL/96N-08, November 1996.
- Military Sealift Command. MSC 2001 in Review – Prepositioning. Washington Navy Yard, DC: 30 September 2001.
<<http://www.msc.navy.mil/annualreport/2001/pm3.htm>> [4 May 2003].

Military Traffic Management Command. Logistics Handbook for Strategic Mobility Planning. Newport News, VA: August 1997.

Operations Support Command. Operations Support Command. Operations Support Command Regulation 10-22. Rock Island, IL: 30 March 2001.

Peters, John E. Project Air Force Highlights: Operation Allied Force – Lessons for Future Coalition Operations. Santa Monica, CA.
<<http://www.rand.org/paf/highlights/operationalliedforce.html>> [3 May 2003].

RDT&E Budget Item Justification Sheet (R-2 Exhibit). Harvest Eagle/Harvest Falcon. Washington, DC: Headquarters U.S. Air Force, Project 4668, February 1999.
<<http://www.dtic.mil/descriptivesum/Y2000/AirForce/0208031f.pdf>> [14 May 2003]

Robertson, Tony, Jr. Quoted in Tirpak, John A, “Kosovo Retrospective.” Air Force Magazine. Arlington, VA: Air Force Association, April 2000, volume 83, number 4.
<<http://www.afa.org/magazine/toc/04cont00.html>> [15 May 2003]

Schrady, David. “Combatant Logistics Command and Control for the Joint Force Commander.” Newport, RI: Naval War College. Naval War College Review, Summer 1999, 49-75.
<<http://www.nwc.navy.mil/press/Review/1999/art2-su9.htm>> [3 May 2003].

U.S. Central Command. “Strategic Deployment.” Operation Uphold Democracy conducted by USCENTCOM 5 November 1994. Joint Universal Lessons Learned (JULLS) report, number 10565-62162. MacDill AFB, FL: November 1994.

U.S. European Command. “DIRMOBFOR (DM4) Not Set Up IAW Doctrine.” Operation Allied Force conducted by USEUCOM. Joint Universal Lessons Learned (JULLS) report, number 10828-224234. Scott AFB, IL: 26 July 1999.

_____. “AMWC/CC Operation Joint Endeavor End-of-Tour Report.” USEUCOM Operation Joint Endeavor conducted 29 December 1995 to 10 February 1996. Joint Universal Lessons Learned (JULLS) report, number 22749-30793. Stuttgart-Vaihingen, Germany: 21 February 1996.

U.S. Joint Chiefs of Staff. Joint Doctrine and Joint Tactics, Techniques, and Procedures For Air Mobility Operations. Joint Publication 3-17. Washington, DC: 14 August 2002. <http://www.dtic.mil/doctrine/jel/new_pubs/jp3_17.pdf> [3 May 2003].

_____. Joint Deployment and Redeployment Operations. Joint Publication 3-35. Washington, DC: 7 December 1999.
<http://www.dtic.mil/doctrine/jel/new_pubs/jp3_35.pdf> [3 May 2003].

- _____. Doctrine for Logistics Support of Joint Operations. Joint Publication 4-0. Washington, DC: 6 April 2000. <http://www.dtic.mil/doctrine/jel/new_pubs/jp4_0.pdf> [3 May 2003].
- _____. Joint Tactics, Techniques, and Procedures for Joint Reception, Staging, Onward Movement, and Integration. Joint Publication 4-01.8. Washington, DC: 13 June 2000). <http://www.dtic.mil/doctrine/jel/new_pubs/jp4_01_8.pdf> [6 May 2003].
- _____. Joint Doctrine for the Defense Transportation System. Joint Publication 4-01. Washington, DC: 19 March 2003. <http://www.dtic.mil/doctrine/jel/new_pubs/jp4_01_1.pdf> [3 May 2003].
- _____. Joint Tactics, Techniques, and Procedures for Airlift Support Of Joint Operations. Joint Publication 4-01.1. Washington, DC: 25 July 1996. <http://www.dtic.mil/doctrine/jel/new_pubs/jp4_01_1.pdf> [3 May 2003].
- Vego, Milan. Operational Warfare. Newport, RI: Naval War College, 2000.
- Vick, Alan and others. The Stryker Brigade Combat Team: Rethinking Strategic Responsiveness and Assessing Deployment Options. Santa Monica, CA: RAND, Project Air Force, 2002. <<http://www.rand.org/publications/MR/MR1606/MR1606.pdf>> [10 May 2003]
- The White House. The National Security Strategy of the United States of America. Washington: 17 September 2002. <<http://www.whitehouse.gov/nsc/nss.html>> [6 May 2003]

ENDNOTES

ⁱ John E. Peters, Project Air Force Highlights: Operation Allied Force – Lessons for Future Coalition Operations, (Santa Monica, CA: RAND, 2001). <<http://www.rand.org/paf/highlights/operationalliedforce.html>> [4 May 2003].

ⁱⁱ Nonie C. Cabana, “Total Mobility Flow: A Post-Kosovo Role for the DIRMFOR,” Air & Space Chronicles, 20 September 2000, 3. <<http://www.airpower.maxwell.af.mil/airchronicles/cc/cabana2.html>> [3 May 2003].

ⁱⁱⁱ Ibid.

-
- ^{iv} Gary L. Coy, DIRMOBFOR Working Brief, (Fort Dix, NJ: Air Mobility Warfare Center, AMWC Course, "DIRMOBFOR," March 2000).
<<http://www.airpower.maxwell.af.mil/airchronicles/cc/cabana2.html>> [3 May 2003].
- ^v Cabana, 1.
- ^{vi} Department of Defense, Report to Congress: Kosovo/Operation Allied Force After-Action Report, (Washington, DC: 31 January 2000), 38.
<<http://www.defenselink.mil/pubs/kaar02072000.pdf>> [10 May 2003].
- ^{vii} Ibid., 42.
- ^{viii} Coy.
- ^{ix} Kevin Leonard, Key Logistics Issues From Kosovo, Can the United States Achieve Strategic Velocity? (Carlisle Barracks, PA: 22 May 2000), 4.
- ^x Ibid.
- ^{xi} Gary Hart, Strategic Distribution: Advanced Study of Air Mobility Class, (St Louis, IL: USTRANSCOM, 1 July 2002), slide 3.
- ^{xii} John Dumond, The Strategic Distribution Management Initiative: Moving to a New Strategic Distribution Vision, (St Louis, IL: USTRANSCOM, NDRI, RAND, February 2002), slide 13.
- ^{xiii} Ibid., slides 14, 15.
- ^{xiv} Ibid., slides 16, 17.
- ^{xv} Tony Robertson, quoted in John Tirpak, "Kosovo Retrospective," Air Force Magazine, April 2000, Vol. 83, No. 4, 5. <<http://www.afa.org/magazine/toc/04cont00.html>> [15 May 2003]
- ^{xvi} Cabana, 4.
- ^{xvii} Ibid.
- ^{xviii} Ibid.
- ^{xix} ...Warfare, (Newport, RI: Naval War College, 2000), 260.
- ^{xx} Ibid., 259.
- ^{xxi} Ibid., 260.
- ^{xxii} Ibid., 261.
- ^{xxiii} Joint Chiefs of Staff, Doctrine for Logistic Support of Joint Operations, Joint Publication 4-0, (Washington, DC: 6 April 2000), I-2.
- ^{xxiv} Task Force 2/14 Commander, "Strategic Deployment," Operation Uphold Democracy conducted by USCENTCOM 5 November 1994, Joint Universal Lessons Learned (JULLS) database, number 10565-62162, (MacDill AFB, FL: USCENTCOM, November 1994).
- ^{xxv} James K. Matthews and Cora J. Holt, So Many, So Much, So Far, So Fast..., (St Louis, IL: September 1996), 85.
- ^{xxvi} Ibid.
- ^{xxvii} Ibid.
- ^{xxviii} Department of the Air Force, Organization & Employment of Aerospace Power, Air Force Doctrine Document 2, (Washington, DC: 17 February 2000), 66-67.
- ^{xxix} Ibid.
- ^{xxx} Joint Chiefs of Staff, Joint Doctrine and Joint Tactics, Techniques, and Procedures for Air Mobility Operations, Joint Publication 3-17, (Washington, D.C.: 14 August 2002), I-4.
<http://www.dtic.mil/doctrine/jel/new_pubs/jp3_17.pdf> [3 May 4, 2003].

^{xxxvi} Joint Staff, Joint Tactics, Techniques, and Procedures for Joint Reception, Staging, Onward Movement, and Integration, Joint Publication 4-01.8, (Washington, DC: 13 June 2000), II-3. <http://www.dtic.mil/doctrine/jel/new_pubs/jp4_01_8.pdf> [6 May 2003].

^{xxxvii} Military Sealift Command, U.S. Navy's Military Sealift Command, (Washington, DC: April 2003) 1. <<http://www.msc.navy.mil/factsheet/apf.asp>> [8 May 2003].

^{xxxviii} Ibid.

^{xxxix} Ibid.

^{xl} Headquarters Department of the Army, Operations Support Command, OSC Regulation 10-221, (Rock Island, IL: 30 March 2001) 2-3.

^{xli} Ibid., 4.

^{xlii} (Newport, RI: Naval War College, 20 November 2002), slide 34.

^{xliii} Headquarters U.S. Marine Corps, Maritime Prepositioning Force, (Washington, DC). <<http://hqinet001.hqmc.usmc.mil/p&r/concepts/2000/pdfs/chapter2/CH217MPF.PDF>> [3 May 4, 2003].

^{xliiii} Military Sealift Command, U.S. Navy's Military Sealift Command Fact Sheet, (Washington, DC: April 2003), 2. <<http://www.msc.navy.mil/factsheet/apf.asp>> [15 May 2003].

^{xliiii} Ibid., 3.

^{xliiii} Ibid.

^{xliiii} Ibid.

^{xliiii} RDT&E Budget Item Justification Sheet (R-2 Exhibit), (Washington, DC: Headquarters U.S. Air Force, Project 4668, February 1999). <<http://www.dtic.mil/descriptivesum/Y2000/AirForce/0208031f.pdf>> [14 May 2003].

^{xliiii} Headquarters Department of the Army, Operations Support Command, 3.

^{xliiii} Global Security Organization, NALMAGTAF, 1. <<http://www.globalsecurity.org/military/facility/nalmeb.htm>> [10 May 2003]

^{xliiii} Ibid., 3.

^{xliiii} (Newport, RI: Naval War College, 20 November 2002), slide 33.

^{xliiii} Joint Chiefs of Staff, Logistic Support of Joint Operations, Joint Publication 4-0, II-5.

^{xliiii} David Schrady, "Combatant Logistics Command and Control for the Joint Force Commander." Naval War College Review, (Newport, RI: Naval War College, Summer 1999), 12. <<http://www.nwc.navy.mil/press/Review/1999/art2-su9.htm>> [3 May 2003].

^l Ibid., 12.

^{li} Ibid.

^{lii} Ibid., 13.

^{liii} Joint Chiefs of Staff, Joint Doctrine for Defense Transportation, Joint Publication 4-01, (Washington, DC: 19 March 2003), chapter 2.

^{liv} Joint Publication 4-0, II-6.

^{lv} Randy A. Kee, Bridging The Gulf Between Strategic and Theater Mobility Systems, (Wright-Patterson AFB, OH: Air Force Institute of Technology, November 1996), 22.

^{lvi} Ibid.

^{lvii} Joint Chiefs of Staff, Theater Movement, II-3.

^{lviii} Richard C. Marr, "AMWC/CC Operation Joint Endeavor End-of-Tour Report," USEUCOM Operation Joint Endeavor conducted 29 December 1995 to 10 February 1996,

Joint Universal Lessons Learned (JULLS) database, number 22749-30793 (Stuttgart-Vaihingen, Germany: USEUCOM, 21 February 1996).

^{lix} John Folkeson, Explaining RAND Metrics or Similarities, Differences & Content of Strategic Distribution CWT (-) vs. VM RWT & CWT, (St Louis, IL: May 2002) slide 2.

^{lx} Dumond, slide 3.

^{lxi} Shawn M. Callahan, The Impact Of Fastship And High Speed Sealift On Strategic Sealift, (Maxwell Air Force Base, AL: April 1998), viii.
<<http://handle.dtic.mil/100.2/ADA395802>> [14 May 2003]

^{lxii} Alan Vick and others, The Stryker Brigade Combat Team: Rethinking Strategic Responsiveness and Assessing Deployment Options, (Santa Monica, CA: 2002), iii.
<<http://www.rand.org/publications/MR/MR1606/MR1606.pdf>> [10 May 2003]

^{lxiii} Ibid.

^{lxiv} Department of the Navy, Naval Logistics. Naval Doctrine Publication 4 (NPD 4) (Washington, DC: 20 February 2001), 43.
<<http://www.nwdc.navy.mil/Library/Documents/NDPs/NDP4/ndp4.pdf>> [3 May 2003].